

ART. VII.—*New or Little-known Victorian Fossils in
the National Museum, Melbourne.*

PART VII.—A NEW CEPHALASPID, FROM THE SILURIAN OF
WOMBAT CREEK.

BY FREDERICK CHAPMAN, A.L.S., &c.,
National Museum.

(With Plates VII., VIII.).

[Read 14th December, 1905].

CONTENTS.	PAGE.
Introductory Remarks - - - -	93
Description of the Fish - - - -	94
Affinities - - - - -	96
Occurrence - - - - -	97
Associated Fossils at Wombat Creek -	99

INTRODUCTORY REMARKS.

The subject of the following notes was included in a series of fossils collected by W. H. Ferguson from Wombat Creek, and submitted to Sir Fredk. McCoy for determination by the Mines Department, Melbourne, about April, 1894.¹ The occurrence of this fish is of very great interest, not only on account of its being the oldest recorded vertebrate from Australia, but also that it represents a species of the genus *Thyestes*, which is by far the largest yet described. The genus *Thyestes* (= *Auchenaspis*, Egerton) has, up to the present, been characterized by small-sized species as compared with the fishes belonging to the allied genus *Cephalaspis*. The specimen now before us vies, in point of size, with the majority of the species of the last-named genus.

¹ I have been unable to find any notes or comments with these specimens.

DESCRIPTION.

Family CEPHALASPIDÆ.

Genus *Thyestes*, Eichwald.*Thyestes magnificus*, sp. nov.

Specific Characters.—The remains of this fish available for description consist of more than two-thirds of the dorsal surface of the head shield, together with two and part of a third series of Dorso-lateral plates, which are fused to the shield posteriorly. The fossil is preserved in a limonitic mudstone, and apparently the external layer of the shield and posterior plates is partially dissolved away; but, in spite of this, the surface tuberculations are represented in strong relief. The Cornua are wanting, but there are indications on the matrix that they were incurved and comparatively short.

Head Shield truncately rounded in front and narrower in that region than is usual in the genus. Sides gently rounded and sloping outwards, having a shallow inflection near the middle of the lateral margins. Border of head shield formed by a strong rim, rounded dorsally, whilst just within, on the anterior and antero-lateral margins, lies a series of short, parallel, oblique bars (borders of the marginal cells), cut off by an inner border, bounded in turn by a series of tubercles. The inner border of the head shield leaves the lateral margins at a distance of about 13mm. from the middle of the anterior rim, curving sharply backwards to meet the inter-orbital ridge.

Surface of Shield (Dorsal), originally more or less convex, but now irregular through distortion and slight crushing on the right lateral side; covered with numerous somewhat large tubercles, each seated in a depressed area, usually hexagonal, the sides of which appear to be finely and radiately striate, as in certain figured specimens of *Cephalaspis lyelli*.¹ The hexagonal tessellation of the shield is best seen in our specimen towards the left posterior angle.

¹ cf. Agassiz. Poiss. Foss., vol. ii., pl. 1b, figs. 1,2.

It is probable that the tubercles are brought out in stronger relief by the removal of part of the external layer of the shield. Occasionally the tubercles are hollow at their summits, a character likewise observed in certain species of *Cephalaspis*.¹ A more or less divergent and quincuncial arrangement is observable with regard to the tubercles, and they appear to radiate from near the base of the head shield. There is an obscure areolation of the surface of the shield, due to numerous sinuous ridge-like lines; each areola enclosing several tubercles. The margins of the post-orbital plate are distinctly seen, as well as the inter-orbital ridge; the latter is tuberculated on the lateral slopes, rough on the summit, and crenate in front. Position of eyes apparently indicated by a pair of elliptical depressions, situated near the base of the inter-orbital ridge, at a distance of about $\frac{1}{3}$ the length of the shield, measured from the front.

Dorso-lateral scales.—In the known species of *Thyestes* the fused posterior body scales seem to have been confined to a single series. In our specimen there appear to be some indications of longitudinal junction lines, separating a dorsal and lateral series, but the evidence for such is not so clear as to allow one to speak positively. The lateral edges of the posterior scales extend almost to the base of the cornua.

The surface ornamentation of the dorso-lateral scales is similar to that on the head shield but finer, the tubercles being about $\frac{2}{3}$ the diameter of those on the head shield. The margins of the dorso-lateral scales are strongly scalloped, and in the present specimen do not extend backward so far along the median dorsal ridge as in *Thyestes verrucosus*, Eichwald.²

Dimensions (Approximate, on account of some distortion):—

Length of Head Shield along median line, from anterior rim to the crista occipitalis - - -	39mm.
Width of Head Shield, measured from the widest part at the base of the cornua - - -	88mm.
Distance of the orbits from the anterior rim of the Head Shield, about - - -	16mm.

¹ See "Fishes of the Old Red Sandstone," Powrie and Lankester. Pal. Soc. Mon., vol. xxiii., 1870, p. 55, pl. xlii., fig 19a (C. lightbodii).

² See Rohon, J. V., "Die obersilurischen Fische von Oesel I." Mem. Acad. Imp. Sci., St. Petersburg, ser. 7, vol. xxxviii., 1892, pl. 1.

Approximate length of Post-orbital Valley	- - -	18mm.
Greatest longitudinal extent of series of Dorso-lateral scales represented in this specimen	- - -	14mm. .
Average diameter of tubercles on Head Shield	- - -	1.5mm.
Average diameter of tubercles on Dorso-lateral scales		1mm.

Affinities.—The present species shows certain affinities to the three known species of *Thyestes*, viz., *T. verrucosus*, Eichwald; *T. egertoni*, Powrie and Lankester sp.,¹ and *T. salteri*, Egerton, sp.² The outline of the head shield, however, is not so long, proportionally, in any of the above-named species, our specimen being more decidedly narrowed in front.

The forward position of the occipital crest corresponds most nearly with that in *T. egertoni* and *T. salteri*, *T. verrucosus* having the crest prolonged far behind the points of the cornua. As regards the post-orbital fossa, the border of its plate in *T. magnificus* is regularly pyriform or Florence-flask shaped, rather than elongately triangular, as in the restored figure of *T. verrucosus* given by Rohon,³ whilst in *T. egertoni* it is apparently elliptical.

Although our specimen is not sufficiently well preserved to allow one to speak of the actual form of the cornua, the base of the left cornu is so shaped that it seems probable, similarly with *T. salteri*, they were more prolonged than in *T. verrucosus*, and recurved towards the body as in *T. egertoni*, but were not so slender. The tubercles of the head shield are of a uniform size in our species; whilst they are variable in *T. verrucosus*, and comprise both large and small.

The characters which help to confirm the above described species as belonging to the genus *Thyestes* are:—

1. The presence of fused posterior dorso-lateral scales.
2. The general form and outline of the head shield.
3. The coarsely tuberculated surface of the head shield, and posterior body scales, comparable to some extent with that of *Thyestes verrucosus*.

1 (*Auchenaspis egertoni*). "Fishes of the Old Red Sandstone." Pal. Soc. Mon., 1870, p. 57, pl. xiii., figs. 3-5; woodcut 30.

2 (*Auchenaspis salteri*), Egerton. Quart. Journ. Geol. Soc., vol. xiii., 1857, p. 286, pl. ix.

3 Op. cit., pl. I, fig. 1.

Whilst showing certain characteristics in common with *T. verrucosus*, *T. egertoni*, and *T. salteri*, the species now named *T. magnificus* differs in the wide, laterally extended, fused posterior elements of the body-covering; in the extremely pronounced tubercular ornament, and the sometimes hollow or perforate character of the tubercles; and in the extraordinarily large size of the head-shield as compared with all known examples of *Thyestes*. The width ratio of *T. magnificus* is as 2:1 in comparison with the measurements of a specimen of *T. verrucosus* given by Rohon¹, and as 4:1 compared with a specimen of *T. egertoni* in the collection of the National Museum.

Occurrence.—This interesting and unique specimen was found in the Silurian (Yeringian) mudstones of Wombat Creek, a tributary of the Mitta Mitta River, N.E. Gippsland.

At this locality the Silurian rocks rest unconformably on the Upper Ordovician slates and sandstones, the slates of the latter group containing *Climacograptus bicornis*, J. Hall, var. *longispina*, T. S. Hall; *Dicellograptus elegans*, Carruthers; and *D. cf. morrisi*, Hopk.

The downward succession of these beds, resting on Ordovician strata, is as follows²:—

4 Shales and fine-grained sandstone, very fossiliferous—with Trilobites, Crinoids, Corals and Brachiopods. (This bed in all probability yielded the fish remains³).

3 Limestone—with Corals and Crinoids.

2 Thin bed of sandstone, with few fossils—Trilobites, Crinoids, Corals, and Brachiopods.

1 Breccia and conglomerate—with internal casts of *Atrypa reticularis*.

From the general facies of the fossiliferous Silurian rocks exposed at Wombat Creek, it is highly probable that the several beds may all be included in the uppermost or Yeringian series.

A noteworthy feature, in common with similar Silurian rocks of other localities, where the junction of the Silurian and Upper Ordovician can be seen, is the absence of the lower, Melbournian,

1 Op. supra cit.

2 See Ferguson, W. H. Monthly Progress Report, No. 3, 1889, p. 17.

3 Mr. Ferguson has since confirmed this opinion.

division ; the rocks overlying the Ordovician being apparently in all cases referable to the Yeringian. This affords us unmistakable proof of a remarkable overlap of the upper division of the Silurian system in Victoria, the more extensive development of the upper beds being a consequence of the gentle subsidence of the lower or Melbournian rocks during the deposition of the Yeringian mud, sands and shelly accumulations in the sea which covered central and eastern Victoria during the later Silurian period.

The uppermost beds of the Yeringian series occurring at Lilydale, in the Upper Yarra, near Mount Matlock and at Wombat Creek, contain a few genera (as *Panenka*, *Hercynella*¹ and *Styliola*) which are elsewhere more typical of the rocks of Lower Devonian age, as, for example, the Lower Helderberg series of North America. In regard to the latter, it is somewhat significant that, whilst the European geologists place the L. Helderbergian in the Lower Devonian, the American geologists consider them, together with the Oriskany Sandstone, as the topmost beds of the Silurian, on account of their containing a large percentage of typical Silurian fossils. Our Yeringian beds in Victoria seem to furnish a parallel case, for, although the small admixture of Devonian forms has inclined some geologists to denominate them as Siluro-Devonian, their general facies shows them undoubtedly to belong to the highest beds of the Silurian. A systematic examination of the Yeringian bivalves, which the writer hopes to publish shortly, furnishes further support to the above conclusion.

Judging by the general aspect of the fossils at Wombat Creek, the mudstones of Bed 4 are probably equivalent in part to the Ludlow beds of Shropshire, the Upper Oesel Group in Russia, and the Waterlime Group (and, possibly, the L. Helderberg series) in North America ; whilst the limestone of Bed 3, including the thick limestone bed at Cave Hill, Lilydale, and the lenticular masses of limestone on the Thomson River, contain a facies which reminds one of the Wenlock Group in England and Scandinavia, and of the Niagara Group of North America. In the present imperfect state of our knowledge of the rich Vic-

¹ This genus also occurs in the Silurian in the Bohemian basin, but is typically Devonian.

torian Lower Palaeozoic fauna, it is impossible, however, to draw any close comparisons between similar faunas elsewhere; but when this lack of knowledge is supplied, the deductions to be drawn from the data thus afforded, promise, undoubtedly, to be full of interest and value to the stratigraphist.

Associated Fossils at Wombat Creek.—Determinations of a series of fossils from Wombat Creek have already been made by Mr. R. Etheridge, junr., who recorded the following forms¹:—

Petraia, sp.; Cystiphyllum (probably); a Cyathophylloid coral; Favosites; Pleurodictyum; Alveolites; Heliolites; Plasmopora sp. nov.; (?) Lingula; Leptaena; Strophomena; Orthis; (?) Pentamerus; Rhynchonella decemplicata; Atrypa reticularis; Cromus muchisoni, de Kon.; Phacops.

From the material collected at Wombat Creek, sent to Prof. McCoy, at the National Museum, I have myself made the following determinations of Yeringian fossils:—Receptaculites fergusoni, Chapm.; Amplexus sp.; Favosites sp. nov.; Encrinurus punctatus, Brünnich, sp.; E. muchisoni, de Kon. sp.; Rhombopora sp. nov.; Chonetes cresswelli, Chapm.; C. striatella, Dalman sp.; (?) Stropheodonta sp.; Orthis testudinaria, Dalman; Atrypa reticularis, Linn. sp.; Atrypina imbricata, Sow. sp.; Spirifer plicatellus, Linn. sp.; (?) Spirifer sulcatus, Hisinger sp.; Cyphaspis sp. nov.; Thyestes magnificus, sp. nov.

EXPLANATION OF PLATES.

PLATE VII.

Thyestes magnificus, sp. nov.

Part of Head-Shield and Dorso-lateral scales. Surface of fossil somewhat decorticated. In Silurian (Yeringian) mudstone, Wombat Creek, N.E. Gippsland. Natural size.

PLATE VIII.

Fig. 1.—Restoration (diagrammatic) of *Thyestes magnificus*, sp. nov. Explanation of lettering:—*a.r.*: antor-

¹ Prog. Rep., vol. x., 1899, pp. 100, 101.

bital ridge; *c.o.*: occipital crest; *d.s.*: dorso-lateral scales; *m.c.*: marginal cells; *o.*: probable position of orbit; *o.s.*: occipital spine; *p.c.*: posterior cornu; *p.o.v.*: post-orbital valley; *r.*: rim.

Fig. 2.—*T. magnificus*, sp. nov. Hexagonal markings of Head-shield, surrounding tubercles; seen on left posterior region of shield. $\times 2$.

„ 3.—*T. magnificus*, sp. nov. Portion of the left anterior margin of shield, above the rounded lobe; showing the form of the marginal cells. $\times 2$.